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CONTENTS

FRONT COVER ILLUSTRATION

An 18-B Bucyrus Revolving Shovel, Varnum P. Curtis, Contractor, Grading an Athletic Field in Worcester, Mass. (See page 329)

Leading Articles

Excavation for the James J. Hill Building, St. Paul 323
Revolving Shovel Work on the 7th Avenue Subway, New York City 327
Grading an Athletic Field with a Revolving Shovel 329
Sewer Excavation with a Revolving Shovel 330
Street Grading with a Revolving Shovel in Los Angeles 332
Stripping a Gravel Pit with an Electric Revolving Shovel 336

Miscellaneous Articles

Highway Construction in the Adirondacks, New York 324
Basement Work in Philadelphia 327
Revolving Shovel Operations in a Sand & Gravel Plant 333
Electric Railroad and Boulevard Construction in the Blue Ridge Range, Tennessee 334

Editorial

Our Revolving Shovel Number 338
Construction Outlook 338

Field Notes

Raising the Boom on a Revolving Shovel, without Power 339
A Correction 339

Shots From the Firing Line

Brief Notes From Men in the Field 339

Index to Advertisers, Page 360.

ADDRESS ALL COMMUNICATIONS TO

THE EXCAVATING ENGINEER PUBLISHING COMPANY

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Fig. 1. 14-B, Digging Rock, Foundations and Stiff Clay.

Fig. 2. 18-B, Getting her Nose into it.

Fig. 3. 18-B in Action. Just Previous to the Time this Photograph was Taken this Shovel Took Out Columns Similar to those Shown to the Right.

Fig. 4. 18-B in Heavy Digging.

EXCAVATION UNDER WAY FOR THE JAMES J. HILL BUILDING, ST. PAUL. 14-B AND 18-B BUCYRUS SHOVELS DIGGING UNUSUALLY HARD MATERIAL.

The Excavating Engineer

Vol. 10 JUNE, 1914 No. 9

Excavation for the James J. Hill Building, St. Paul

An example of exceptionally heavy digging encountered and successfully handled by small revolving shovels.

THIS is a story that can be told best by photographs. In St. Paul at the present time there is under way the construction of the new James J. Hill Building, which is to house the general offices of the Great Northern & Northern Pacific Railroads. The work is being done by Butler Brothers Building Company of St. Paul, the largest building contractors in this part of the country.

Excavation is now under way. 18-B and 14-B Bucyrus revolving shovels are being used, the former equipped with a ⅞ and the latter with a ⅝ cubic yard dipper.

Both shovels are double-crewed, working both night and day. They are loading from 300 to 350 dump wagons per 10 hour shift, each wagon carrying a little better than 1½ cubic yards of material on an average. When the character of the digging is considered, this output is regarded as remarkable. The number of teams serving the shovel vary between 65 and 72. The round trip to and from the dump consumes from fifty to sixty minutes.

It may be observed that the wagons used are the old fashioned dump-board type instead of the newer style patented bottom-dump wagons. The great quantity of rock encountered was bound to

Excavation Operations in Progress. 18-B and 14-B Bucyrus Revolving Shovels in Action.

damage any wagon to some extent. Indications seemed to establish the fact that the dump-board wagon could more easily and more cheaply be kept in commission with the least delay, consequently it was found advisable to adopt this type.

The shovels are operated by three men instead of the customary crew of two. Besides the engineer and fireman, a third man is employed for tipping the dipper, so as to aid in keeping the wagons moving steadily and in saving every possible delay.

The views give a graphic idea of the material encountered. It may be noted that a great part of this consists of stiff clay and a large amount of stone,

Fig. 5. 14-B Digging High Bank of Stiff Clay, Stone and Old Foundations. These Were Dug Without Blasting.

concrete and pieces of old foundations intermixed. Figures No. 1 and No. 5 showing the 14-B in action illustrate this very clearly. When this shovel first went through it met the same character of material shown behind the shovel in Fig. No. 5, large and small stone mixed with clay and debris. A large amount of foundations were encountered, and have been torn out by the shovel without the aid of blasting.

In the right background of Figure No. 4, showing the 18-B in action, a number of piers are shown. This shovel, just previous to the time that this photograph was snapped, was taking out columns similar to these, unassisted by powder.

When these conditions are taken into consideration, the output mentioned above might rightly be considered as extremely satisfactory.

One good element in making this possible is the spirit of friendly rivalry which seems to pervade the organization, particularly the crews of the two shovels, who are constantly striving to outdo the other in the quantity of material handled.

One day an old negro was brought in from the mountain district under suspicion of maintaining an illicit still. There was no real evidence against him.

"What's your name, prisoner?" asked the judge, as he peered at the shambling black man.

"Mah name's Joshua, jedge," was the reply.

"Joshua, eh?" said the judge, as he rubbed his hands. "Joshua, you say? Are you that same Joshua spoken of in Holy Writ—the Joshua who made the sun stand still?"

"No, jedge," was the hasty answer, "two'nt me. Ah'm de Joshua dat made de moon shine."

Highway Construction in the Adirondacks, New York.

Highway construction through the mountainous region of the Adirondacks in north eastern New York is not of the simplest variety. As a rule the roads follow the course of small rivers or mountain streams through winding, and at times, narrow valleys, quite thickly wooded.

The geological formation is peculiar. Without attempting to enter into a scientific dsecription it may be said that the valleys very frequently contain chains of lakes fed by mountain streams. Some are small and others, such as the Ausable lakes, are a few hundred feet wide and three to four miles in length with precipitous sides. Many of the valleys now dry, except for the streams which flow through them, give plain signs of having been at one time lakes. One peculiar evidence of this may be seen in the steeper cuts made in excavating for the roads; the lower portion of a cut always consists of red clay in strata of from six to twenty four inches in thickness, each layer separated by a growth of moss or a fine, almost transparant vine. The sepage through this is, of course, excessive. Over this lie mounds of sand of various heights similiar in consistency to moulding sand.

Last summer the State of New York was carrying out extensive road construction through this region.

Beede Brothers of Keene Valley, New York, had the contract for what was known as Highway No. 5235 from Jay to Upper Jay in Essex County, through the valley of the Ausable River. The total excavation amounted to 26600 cubic yards. The work took about six weeks to complete.

The equipment consisted of a Bucyrus 14-B revolving steam shovel carrying a $\frac{5}{8}$ yard dipper and an outfit of Eagle dump wagons with double side boards.

The interesting feature of the work was a 1000 foot side hill cut. The average slope of this hill was about 2 to 1 and 75 feet in height. The shovel worked parallel to this slope for the whole 1000 feet, taking out the toe to an average width of about 20 feet. No attempt was made to slope the cut, the shovel working ahead, leaving a steep cut. This method left a large amount of material to pull down after the shovel had passed in order to make the neat or finished slope. This was accomplished in the following manner:

Ditches were dug by hand parallel to the cut, up the sides of the original slope, which, of course, varied in height. These were cut at intervals from forty to fifty feet. These ditches simply penetrated the top soil, severing the mat of sod and fine tree roots from the soil. By means of these ditches it was simple, as a rule to cause a heavy slide. Where this was not possible by hand, it was accomplished by a comparatively light blast. In most cases the slopes

14-B Bucyrus, Beede Brothers, Contractors, on State Road Construction, New York.

left by these slides were so nearly true to specifications that hand work was found to be unnecessary. In some few instances the neat slope was obtained afterward by hand.

Throughout the length of the cut the shovel dug from a foot to eighteen inches below sub-grade. As stated once before, above the clay strata lay a sand deposit similar to moulding sand. This formed a great part of the slide and was used as a filler for the boulder sub-base to bring the road to grade. It was found to be of such good quality that the State engineers ordered it to be used for this purpose on other near-by sections of the road where it was needed. The surplus, which was small, was cast by hand over the shoulder of the road, thus widening the river side. The extreme haul was less than 400 feet. The output of the shovel, of course, varied, but Jason D. Jones, the operator reports that in one ten hour day, when working under the conditions described, the shovel moved 1000 cubic yards of material. One half hour of this time was lost in moving up, coaling and taking on water and other delays. This report was certified to by F. S. Beede, for the firm, B. Beede, timekeeper, Earl A. Hall, chauffeur and Duke Austin fireman on the shovel.

Encouragement

A gang of laborers was employed digging a mysterious ditch across the street. It was a sewer or a place to put a gas-pipe, or something. One man in particular was working as if he were a chorus man in a play, just going through the motions and pretended to dig a ditch. The foreman came along and spoke to him.

"Don't be afraid," he said, with rich sarcasm. "Lean on th' shovel now an' thin. If it breaks I'll pay for it."

Exchange.

"What's all the row over on the next block?" a reporter asked of a policeman.

"Aw, only a wooden weddin'."

"A wooden wedding?"

"Sure, a couple of Poles is gettin' married."

Exchange.

Degnon Contracting Company's 18-B Bucyrus Shovels Digging the Seventh Avenue Subway, New York City.

Revolving Shovel Work on the Seventh Avenue Subway, New York City

THE large amount of new subway construction in New York City at the present time includes practically every variety of excavation problem. Section 3 of the Seventh Avenue subway is particularly interesting because of conditions permitting the use of steam shovels. This section is a four track subway extending from Commerce Street to Beach Street along Varick Street and 7th Avenue, a total distance of 4334 feet.

Varick Street, under which the greater length of this section lies, runs parallel to and about four blocks east of the Hudson River. It runs through an old section of the city where the cross streets are narrow and traffic is congested on account of the large amount of trucking to and from the North River docks.

The buildings in this section are for the most part old three to four story tenement houses and the amount of shoring and foundation work is therefore not so great as where the subway passes through the lower part of the city and skyscrapers predominate. Varick Street is now 65 feet wide and will be widened to 100 feet. To do this the buildings have been razed along the east side of the street. The finished subway section under the street will be about 60 feet wide and extend from 24 to 30 feet below the street surface.

The total excavation for the entire section consists of 265,000 cu. yards of which sixty per cent will be taken out by three shovels; two of them being 18-B Bucyrus revolving shovels and one a number "O" Vulcan revolving shovel. At the time this article goes to press these shovels are taking out the first cut which is 12 feet deep, 25 feet wide on the bottom and 40 feet on the top. The shovels were started to work in March at intervals of several blocks apart along Varick Street in the place originally occupied by the old buildings to the east of the side walk.

The street and sidewalks will be replaced by timber construction supported on timber columns about 20 feet centers. On the second lift the shovels will be able to excavate between these columns. The material may be classified as clay, sand, boulders old wall and foundations. No explosive will be necessary excepting where an occasional boulder is encountered too large for the shovels to handle. Where cross streets have no large sewers or car tracks they will be cut through with the shovels and bridged over. Where cross streets have car tracks and large sewers the excavation of the first lift under these streets will be done by hand and bridged over.

The accompanying views show the two Bucyrus 18-B shovels taking out the first lift. In this lift the material is loaded into wagons holding approximately 3½ cubic yards loose measure. It is hauled to a dock on the Hudson River, dumped on scows and towed to sea.

Coke is used as fuel on account of the New York smoke ordinance. Water is piped to the shovels.

When the second lift which will be 12 feet below the first lift and 25 feet wide at bottom is taken out, narrow gauge cars will be used to take material from the shovels. These cars will be run to a derrick and hoisted to a hopper into which they will be dumped and the material then run into wagons on the street level.

The Degnon Contracting Company of New York City has this contract, M. J. Morris is general superintendent and R. P. Gustin, engineer in charge of the work.

Basement Work in Philadelphia.

The accompanying photograph shows work in progress on the excavation for the basement of The Corpus Cristi Orphans' School at 28th Street and Alleghany Avenue, Philadelphia. The work is being done by Thos. Connor of 1529 North 5th Street, Philadelphia, with a 14-B Bucyrus revolving

shovel, equipped with a ⅝ yard dipper. The total excavation, which amounted to 6,000 yards, was handled in 16 days, including all delays. The best days' work was the loading of 530—1½ yard dump wagons in ten hours.

William Prichard operated the shovel.

Grading an Athletic Field in Worcester with an 16-B Bucyrus.

Grading an Athletic Field with a Revolving Shovel

An illustration of the value of the "direct thrust" on a revolving shovel for making a gradual, true slope.

THE Worcester Polytechnic Institute of Worcester, Massachusetts, has under way the construction of an elaborate athletic field. The work is being done by Varnum P. Curtis of Worcester. The excavation, which is the portion of the contract in which we are most interested, was executed between July 17th and the last of November. The total yardage amounted to 28,700 cubic yards, 20,000 yards of which was taken out of a heavy cut averaging about 25 feet, and the balance in shallow cuts.

The excavation was done with an 18-B Bucyrus shovel equipped with a 7/8 yard dipper.

The field covers an entire block, measuring 1400 feet long with a maximum width of 860 feet and a minimum of 600 feet. The excavation and filling was done in the extreme west end of the field for the football and baseball fields and the running track. This covered the whole width of the property with a depth of about 480 feet.

Placing Loam on East Slope of Field.

Excavation was confined to one heavy cut mentioned before and a few light ones. The filling was done in the north end of the property for the baseball field.

The material handled consisted of hard clay, boulders and some rock. The shovel was served by an average of five or six teams, which hauled the dirt away in two yard wagons. The haul averaged about 500 feet.

The number of teams, however, was not sufficient to keep the shovel busy; two or three more could have been used to good advantage.

The 20,000 yards in the big cut, however, was moved in 50 days actual operation, giving an average output of 400 cubic yards per day, which was considered good, considering the hard material and the delays caused by the small number of teams on the job. The highest output recorded was 33 two yard wagons in one hour.

An interesting feature of the work was the method of making the slope of 2 to 1, called for in the specifications. As stated before, the height of the cut was 25 feet, which, of course, called for a very gradual slope. The shovel worked from the top down, trimming as close to the neat line as possible.

Shovel at Work on East Side of Field.

Because of the amount of material to be handled, five lifts were taken, which made it necessary to leave a ridge of material after each lift to be pulled down.

On account of the flexibility of the "direct thrust", (i. e. independent thrusting engines acting directly on the dipper handle) it was possible, even in these few cuts, to trim the slope close enough so that the ridge remaining could easily be pulled down by hand. This could not have been accomplished in as economical a manner by any other type of crowding motion.

As may be seen from some of our views, Mr. Curtis operated his shovel on timber platforms, so as to assure stability.

The shovel was operated by John Reed, who was assisted by a fireman and two pitmen.

A traveler in Indiana noticed that a farmer was having trouble with his horse. It would start, go slowly for a short distance, and then stop again. Thereupon the farmer would have great difficulty in getting it started. Finally, the traveler approached and asked solicitously:

"Is your horse sick?"

"Not that I know of."

"Is he balky?"

"No, but he is so danged 'fraid I'll say whoa and he won't hear me that he stops every once in a while to listen."

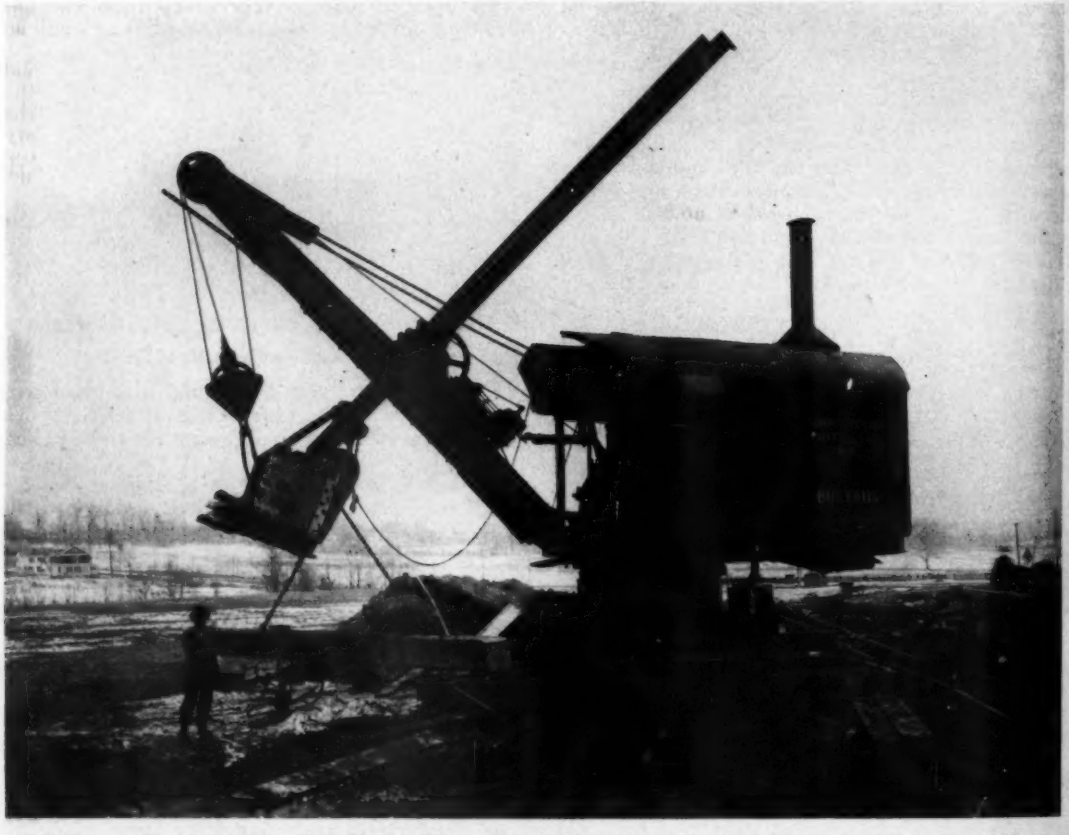
—*Saxby's Magazine.*

Sewer Excavation with a Revolving Shovel

Illustrating an extremely efficient method of operation with an up-to-date outfit.

GEORGE Hyman, of Washington, D. C. has been operating an 18-B Bucyrus shovel for digging sewers in and about the city of Washington. The success which he has attained makes it well worth while to study his method of operation.

Mr. Hyman has used this machine recently for digging ditch for sewer pipe and also for concrete



18-B Bucyrus Shovel, Swinging Chair Tie Into Place. Note the Arrangement for Laying the Rails and the Special Bands on the Wheels.

The shovel is equipped with a 27 foot handle, enabling it to dig to a depth of 18 feet, below the bottom of the wheels. The dipper has a capacity of ⅞ of a cubic yard. It is fitted with five forged teeth, three on the front, and one on each side. These side teeth are intended as side cutters in order to assure sufficient clearance to lower into the ditch easily after a cut has been made. The neatness of the ditch it can cut is well illustrated in one of our views.

and brick sewer. The most recent job was a ditch for an 18 inch sewer pipe. This work is illustrated by our photographs. This ditch is 3300 feet long, varying from 10 to 27 feet in depth. The material is hard clay with a little shale at the bottom. As some of the work was done when the bottom was

somewhat frozen the digging was very hard.

For the concrete and brick sewer, the shovel excavated a trench 18 feet deep, seven feet wide at the top and an average of five feet at the bottom. This sewer had a concrete invert and a brick arch. The speed of the building of the invert and the brick arch governed the whole progress of the work. The shovel under these conditions made about 65 feet advance a day, but this naturally is not an index of its capacity.

The material was loaded into two-yard Western side-dump cars traveling on light rails laid alongside the trench. This material was hauled back and dumped directly into the backfill, as illustrated. This method was persued whenever possible. In a few places, however, owing to local conditions, it was necessary to overcast a small amount of material, which was later rehandled. The excess material not required for back-fill was taken away in wagons.

Loading Cars for Back Fill.

The bracing of the trench was put in by hand, small jack screws at the end of the blocks held the sheeting in place.

Two men were used for pushing the cars, although at times a mule was employed.

The concrete invert was laid immediately back of the shovel in the trench dug by the shovel on the preceeding day. The brick arch was built on the second preceeding day's invert and was allowed to stand a day before the back-fill was placed upon it. This, as will be seen, left 200 to 300 feet of open excavation. Hence it was necessary only to keep the shovel ahead of the concrete gang.

The organization of the job was so well planned, that a very few men were employed.

The shovel, as will be seen, is mounted on traction wheels, to which are riveted circumferential bands formed of channel iron, which give a double flange on the wheel. The shovel runs on rail sections about 3 feet long, mounted on 12x12 inch timbers.

Back Filling in Progress, Cars Going Back to Shovel.

These timbers, seven in number, span the trench. They are in reality long chair ties, as may be noted from our photographs. In order to move forward a chain sling, hung over the dipper handle was hooked into I-bolts in the chair ties, or timbers. This is illustrated clearly in our photograph on page 330.

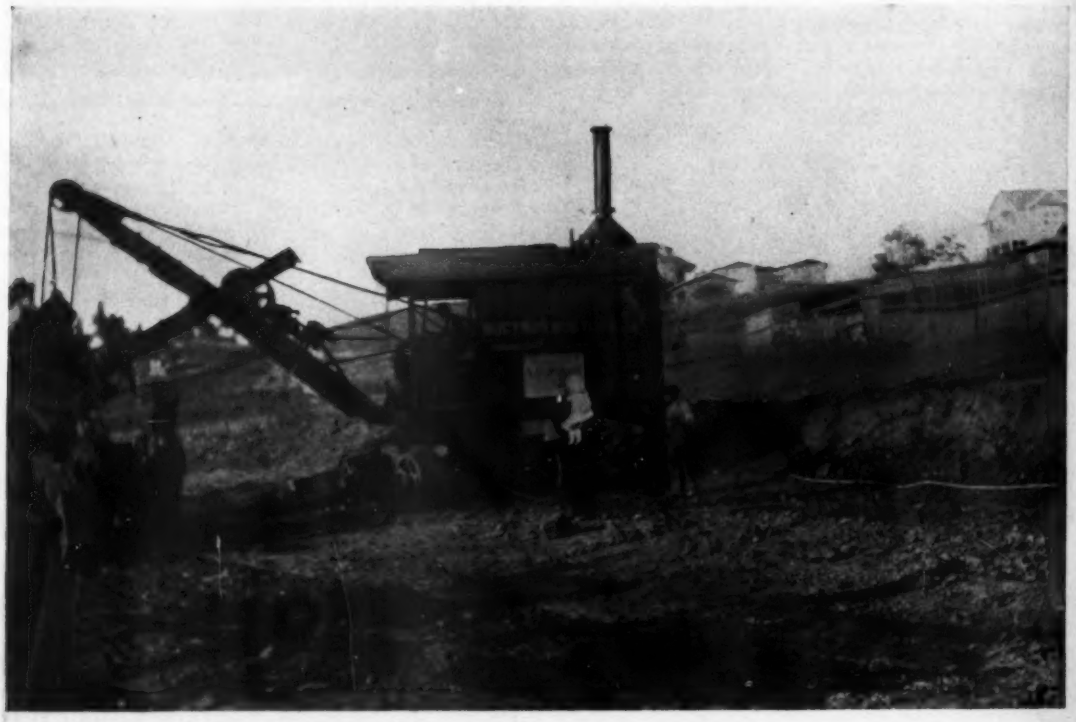
Mr. Hyman deserves much credit for the efficient organization of his jobs.

Note Clean Ditch, Method of Timbering Ditch and Mounting the Shovel.

Street Grading with a Revolving Shovel in Los Angeles

23,000 yards handled in 34½ days—Cost of operation in record of outpnt—System of cost keeping.

SULLIVAN, Gabler & Kautz of Los Angeles, have recently completed a grading job on Glendale Avenue, on which, despite the shallow cutting, they used a small revolving shovel to splendid advantage. The total yardage amounted to 23,016 cubic yards, bank measure, which was handled between March 10th and April 25th, 39½ days in all, including Sundays.



18-B Bucyrus Shovel, Cutting Roads in Los Angeles.

The work was handled in an extremely systematic and efficient manner. C. J. Gabler, a member of the firm, operated the shovel, and made an exceptional record considering the stiff character of the material and the depth of digging.

The shovel, which was an 18-B Bucyrus, equipped with a ⅞ yard dipper, burned fuel oil. 12 tanks, or 10,080 gallons were consumed during this period. The oil cost $12.00 a tank.

Throughout the entire job, Sundays were regularly devoted to washing out the boiler, cleaning the flues and making sundry repairs, which, doubtless accounts to a large degree for the regularity of the output. Although the greater part of the material was classified as earth there was over 7,000 yards of rock and sand stone, besides 2300 yards of hard adobe clay, which, naturally cut down the capacity of the shovel considerably.

Very accurate costs were kept. This was facilitated by an excellent type of log book, or daily report sheets of the shovel performance. We reproduce herewith, a sample sheet.

Each sheet is in duplicate, a white and a yellow copy. The white sheet is perforated. This is filled in at the end of every day by the shovel engineer and turned in, a copy remaining in the book; thus a

18-B in Action.

complete detailed record of every job is kept.

From this log book we are able to produce the following table showing the preformance of the shovel on this contract:

Total yardage (bank measure)	23,016 cu. yds.
Total time under steam	34½ days.
Lost time including delays for moving, blasting, repairs, etc	23½ hours.
Average yardage per hour working	67.8 cu. yds.
Average yardage per hour under steam including delays	63.4 cu. yds.
Maximum output per 11 hour day bank measure..	735 wagons 1000 cu. yds.
Cost of labor, fuel, sundries, etc (This does not include Mr. Gabler's time)	.024 per cu. yd.
Cost of labor, including allowance for engineer.... (Including delays.)	.033 per cu. yd.

The best week's output was perhaps the first week in April, the record of which we give below:

Date	Hours Worked Including Delays	No. of Wagons	Estimated Yardage Bank Measure	Average Per Hour
April 1	10	652	900	90
" 2	10	637	850	85
" 3	11	682	1000	82
" 4	11	724	1000	91
" 5	11	577	800	73
" 6	11	662	850	77
" 7	11	735	1000	91
"				
	7 days	75 hours	4649 wagons	6300 cu.yds 84 cu. yds.

It might be interesting to note that after the completion of this job, the shovel was moved a distance of about seven miles in 2½ hours by the

SULLIVAN, GABLER & KAUTZ — DAILY REPORT OF STEAM SHOVEL

NO. OF STEAM SHOVEL	PAY ROLL NO.	TIMES WORKED	RATE PER HR.	AMT.	MATERIAL	YDS.	PRICE PER YD.	AMT.
Engineer								
Fireman								
Pitman								
"								
"					TOTAL EARNINGS			$
Watchman					Fuel Oil Gals. @ ¢			
Miscellaneous					Lube Oil Gals. @ ¢			
"					Water cans per day			
"					Sundries Expense			
"					Pay Roll today			
"					TOTAL EXPENSE			
TOTAL					NET			

General Report of Days Work

Location of Shovel Shift Date 191

Sample Sheet From Log Book.

use of two five-ton automobile trucks. The propelling was done entirely by the trucks at a cost of $2.25 per hour per truck.

Revolving Shovel Operation in a Sand and Gravel Plant.

Our illustration shows an 18-B Bucyrus revolving shovel at work in the Concrete Stone & Sand Company's pit at Youngstown, Ohio. The excavating problem here is a simple one, and consequently requires no particular description. The face carried in the pit averages about 20 feet. The material handled is sand and gravel. The shovel dumps into 2-yard steel cars, which are hauled by horses to the foot of the incline, up which they are hoisted by a friction hoist. The output, of course, is governed somewhat by the demand, but the shovel loads 250 two yard cars in nine hours at a cost of about $7.50.

The advantage of a revolving shovel in this particular proposition is that the material by this means may be worked all around the pit. The owners say the 18-B is "a wizard for speed". 35 men are employed on the job.

18-B Bucyrus Shovel, Loading Sand and Gravel.

Mutual Admiration

"You are getting very bald, sir," said the barber.

"You yourself," retorted the customer, "are not free from a number of defects that I could mention if I cared to become personal."—*Chain Belt.*

View from Signal Mountain Boulevard, Chattanooga, Tenn.

Finished Boulevard and Trolley Line Showing Character of Construction Work.

Electric Railroad and Boulevard Construction in the Blue Ridge Range, Tennessee.

Describing unusually heavy digging by a small revolving shovel on Signal Mountain, near Chattanooga.

In the Blue Ridge Range north of Chattanooga, which has long been famous for its scenic beauty, Signal Mountain rises to an altitude of 2200 ft. Up this mountain the Chattanooga Traction Company have recently built a car line. This line extends from the foot of the mountain to the Signal Mountain Hotel, which is situated at an altitude of 2,000 ft. The line winds for a distance of about six miles around and up the mountain. In some places it is possible to look down upon three loops, one directly under the other.

It is easy to realize, therefore, the difficulty of the engineering problem. This difficulty is augmented by the fact that most of the construction is through solid rock. The average grade of the line is 5%. Simultaneous to this work the Chattanooga Estates Company of Chattanooga, who own most of the land in this vicinity and operate the Singal Mountain Hotel, have been constructing a splendid macadamized boulevard up the mountain. The length of this road is about eight miles, the grade varying from 6 to 11%. From both the car line and the boulevard one can see some of the grandest scenery in the world, according to local enthusiasts. The work on both the car line and road is engineered under the personal supervision of Webster T. James. The excavation work on the car line and the grading of a good part of the boulevard has been done by a Bucyrus 14-B revolving shovel, equipped with a 5/8 yard dipper.

The accompanying photographs show the machine, where it is now being used, in a borrow pit at the foot of the mountain. Here it is loading 4-yard Western dump cars for filling in some of the high tressels along the line. From the appearance of the steam shovel's house, it can easily be appreciated that this machine has experienced some very rigorous rock digging. Mr. James advises that he has put this shovel into every class of work that it was possible to find in the construction of both the car line and the boulevard, and he has yet to find a place where it has failed to do the work successfully which it has been called upon to handle. He adds that he believes that it is practically impossible, under the present day conditions, to build a car line or a road in an efficient manner without the use of a steam shovel.

14-B Bucyrus in Ballast Pit at the Foot of Signal Mountain, Chattanooga, Tenn.

The Gravel Pit. 14-B Electric Stripping, Little Giant Loading Gravel, 60-C Digging a Pocket of Clay, (see page 337).

Looking from Top of Pit Towards Plant. Cars Shown Dumping Into Hopper.

WAUKESHA LIME & STONE COMPANY'S GRAVEL PLANT, NEAR WAUKESHA, WISCONSIN.

Stripping a Gravel Pit with an Electric Revolving Shovel

Gravel Plant of the Waukesha Lime & Stone Company, Waukesha, Wisconsin
Power consumption and output of shovel—Method of operation.

THE Waukesha Lime & Stone Company's plant lies about two miles out of Waukesha Wisconsin, on the lines of the C. M. & St. P. and the M. St. P. & S. S. M. Railways. The property covers an area of about 230 acres on both sides of the Fox River. At the present time they are operating three quarries and plants, one for limestone, one for crushed stone and a third for gravel, but all their shovel equipment consisting of a Bucyrus 60-C steam shovel, a Vulcan Little Giant steam shovel, and a Bucyrus 14-B electric revolving shovel, is being used in the gravel plant. Here they are cutting into a hill having an elevation of 107 feet above the Soo Line tracks, which run by the plant.

The 14-B is used for stripping, and has recently started work on the summit of the hill, as may be seen from our views. This shovel was installed in January 1913. It was operated for a few weeks, until stopped by severe freezing weather, stripping the overburden from the limestone quarry. Work was resumed the following summer, from which time until this Spring it was used only at such periods as there was time between rush of other business. During this period, sufficient overburden was removed to last for a number of years. On May 1st of this year it was moved to the gravel plant and has been working steadily ever since. Here there is about 140,000 cubic yards of stripping which will be removed as the gravel is required. At the

14-B Bucyrus Electric Shovel, Stripping—Waukesha Lime & Stone Company.

present time the shovel is averaging from 300 to 350 cubic yards daily. The material handled ranges from black earth on top to yellow soft clay at the bottom, intermixed with occasional pockets of gravel and a considerable quantity of boulders running in size up to 24 inches in diameter.

14-B Electric, Stripping.

The shovel has never been pushed to its limit, consequently figures of output do not look startling, the best day's output being about 418 cubic yards. The cost of power has run about 1.3 cent per cubic yard.

In regard to the performance of the shovel, Jas. J. O'Laughlin, secretary of the company states as follows:

"We have never had one minute's delay for repairs or breakdowns, and while the machine is a trifle slower than a similar steam machine, we feel that economies effected through not having to haul coal and water, particularly in freezing weather, more than offset its slightly less capacity. We also save a foreman's wages, as one man handles the machine."

The shovel is the standard 14-B type as manufactured by the Bucyrus Company. It carries a ⅝ yard dipper and is equipped with a 30 H. P. hoist motor, and 15 H. P. swing and thrust motors. In order to protect it from possible injury from blasts, the roof ordinarily supplied is replaced by one made with 1¼ inch yellow pine armoured with No. 14 sheet iron.

The stripping runs between 2 and 20 feet. The material is loaded into wagons and is hauled to a fill which is at present about 400 feet from the shovel.

The power for the crushing plant is stepped down from 2300 to 440 volts by three transformers. Instead of bringing it up the hill at this voltage, it is taken up at 2300 volts, and cut down to 440 volts by two transformers mounted on a pole 300 feet from the shovel, thus making it possible to use a lighter and cheaper transmission line.

The output of the plant is 2500 cubic yards per day, which is taken out by the 60-C. The Little Giant is kept in the pit as an auxiliary for emergencies. Occasionally streaks or pockets of clay are encountered. There is always a demand from the railroads for this material for filling and consequently when such a pocket occurs it is shot, and loaded. At the time the photographs accompanying this article were taken, the Soo Line had called for 240 cars of filling, as a pocket had been struck ahead of the 60-C, this shovel was put on this, and the Little Giant was steamed up and set to work on the gravel.

The shovels are working against an 86 foot face.

Two locomotives are used, an 18-ton Davenport and a 16-ton American, and 4-yard Western cars fitted with 10 inch side boards, so as to give them a capacity of 5 cubic yards.

We are indebted for the above information to Jos. J. O'Laughlin, secretary, and F. C. Wolf, superintendent of the gravel plant.

On the Top of the Pit, Stripping Operations.

The Excavating Engineer

(FORMERLY STEAM SHOVEL NEWS)

A Monthly Publication Devoted to Excavating *and* Allied Subjects

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THE EXCAVATING ENGINEER PUBLISHING CO.

Bradlee Van Brunt, Manager and Editor

247 National Avenue Milwaukee, Wis., U. S. A.

Our Revolving Shovel Number.

As our front cover indicates, this number is devoted to the subject of the small revolving shovel. Like its big brother, the railway type shovel, the multiplicity of the uses to which it may be put to advantage is a development of but recent years. Such a state of affairs cannot be born over night. The modern man of business must be shown, and as a general rule, he can only be shown by the success his neighbor has had under circumstances which he may consider to be similar to his own.

Were the inquirer to examine the sales report sheet of a steam shovel manufacturer for a month when business in most lines is as dull as the proverbial gray November day, he would wonder how this country of ours could absorb the number of new machines that are being shipped in times when work in most lines is most discouragingly quiet. The answer is the proof that the day has come when the revolving shovel, if it has not already reached, is rapidly reaching, its own.

Six or seven years ago if a city contractor bought a revolving shovel, his action might have been looked upon with amazement, if not with amusement by his friends and competitors. If the old team and scraper method has been used satisfactorily for years, where was the wisdom in deserting the well-trodden, for this new and unblazed path? Time has shown wherein our pioneer was wise—he finished many jobs while his friends were struggling with one, he worked in storm, in tempest, in zero weather and under the blaze of a 100° sun, with an undiminished output. He underbid them and finally led them down his own newly-blazed path.

It is needless to name the fields it has invaded: Cellar work, road work, gravel pits, clay pits, ditches, mines, quarries; to these the revolving shovel is no longer a luxury or an expensive experiment—it is a necessity.

Construction Outlook.

The clouds at last seem to be breaking on the very gloomy construction outlook. According to reliable reports, the Interstate Commerce Commission will lift the lid some time between May 25th and June 10th. Indeed some press reports seem to indicate that the decision which has been awaited with such eagerness by contractors and manufacturers the country over, will be made public before this number is off the press. As to the result, a wave of optimism seems to pervade those who have been following the situation. The general trend of opinion appears to be that an increase will be allowed on the classified list but not on commodities. There is much work that the railroads must do, work which has been held for months awaiting developments. Indeed, indications seem to point to the fact that the immediate placing of work is certain. We are, however, inclined to warn over-enthusiastic ones that there will be no "bumper crop" of big construction jobs, at least for the present. The indications which we mentioned are very positive ones. April was depressingly dull but towards the last of this month a new line in South Dakota, the Fairmount and Veblen Ry. placed a 40 mile extention in the hands of the contractor, a contract which involved 1,000,000 cubic yards of earth and 5,000 yards of rock excavation, besides 20 bridges. On the 14th of May the Chicago & Northwestern awarded a good sized contract to the Walsh Construction Co., and on the same day the Chesapeake & Ohio opened bids on the first portion of its new 92 mile line in Kentucky and Ohio. This is at least encouraging.

Indications also point to the fact that the United States Reclamation Service will not be alone in lending zest to the drainage and irrigation fields. It is understood that the improvement in the money market has stimulated private companies to go ahead with their projects and a number of large projects have recently been advertised and more are on the horizon. The Reclamation Service's Grand Valley Project in Colorado with its 1,900,000 cubic yards of excavation to be opened this month, stands out strongly in the irrigation filed.

FIELD NOTES

DISCUSSION IS INVITED FROM MEN IN THE FIELD ON SUBJECTS HERE PRESENTED

Raising the Boom on a Revolving Shovel without Power.

F. C. Wolf, superintendent of the gravel plant of the Waukesha Lime and Stone Company's plant, Waukesha, Wisconsin, tells us of a very simple and effective method of raising the boom of a small revolving shovel without power. The shovel on which he practiced this was a Bucyrus 14-B electric.

The boom was brought up on a wagon and backed up against the circle. A sheave was hung between the turnbuckles back of the A frame. The cable was led from the hoisting drum over this sheave and on to the boom. The guard, which covers the gear on the intermediate shaft was taken off, and the boom hoisted by turning this gear by foot power, that is, by stepping on the spokes of the gear. The load was held by means of the brake on the hoisting drum. The handle was hoisted in the same manner. The whole operation consumed but 2½ hours. The crew consisted of Mr. Wolf and four men.

A Correction.

A. C. Duesing, former assistant superintendent of the Cook Construction Company, on the Montreal reservoir work, calls our attention to a small inaccuracy in the sketch published with our article entitled "A Practical Type of Section for Dragline Operation" in our April number.

By referring to this sketch our readers will notice that the outside timbers are brought up flush with the end tie on the right hand side. A more practical arrangement would be to cut these timbers off half way between the last and next to the last ties on the right hand side. This would allow the projecting ends of the timbers on the connecting section to lap over and make a better fit.

SHOTS FROM THE FIRING LINE

Alabama

Birmingham and Vicinity.

By R. S. Byron

The Crow Contracting Co. of Mt. Pleasant, Tenn, are installing their Class 24 Bucyrus drag line at Centerville, Tenn. This machine is to be used for stripping phosphate. Mr. Langdron of the Bucyrus Co. is installing this machine. The Crow Contracting Co. have a contract at Centerville with the I. A. C. for stripping 200,000 yards annually.

The Callahan Co. of Kansas City are getting their dragline and machinery on their own work near Leland, Miss. They have about a million yards and subed this from R. H. & G. McWilliams.

The Murray Construction Co. of Knoxville, Tenn. was awarded road work in Maryland amounting to $80.000. Mr. Murray advises that dirt is moving and that everything is moving along nicely.

Stacy & Delaney have subed all but about 4 miles of their levee work near Frairs Point, Miss. to team outfits. This work was awarded last month and consists of about 1½ million yards. Mr. Stacy will do about 4 miles of the work and has just purchased a 40-R Bucyrus steam shovel to load his wagons with.

The Chattanooga Traction Co. is operating their 14-B Bucyrus shovel at the foot of Signal Mt. near Chattanooga loading cars, and are filling trestles on their street car line.

From reports it does not look as though it will take the Roach, Stansell & Lawrence Co. of Memphis very long to finish their levee work at Marion, Ark., which consists of about 4½ million yards as it is stated that they must have about 5000 teams on this work already.

James Downey of this city has just returned from a visit to his brother Dan who is superintendent on Jas. T. McCarthy & Co's. work in Southern Ala. Mr. Downey reports Dan in the best of health and the work going along nicely.

George Stanbery of the Bucyrus Co. has just returned to his home in Birmingham after installing two large electric drag lines in Montana one for Yale and Reagan and the other for Buchanan & Co., George seems to be fit as a fiddle.

Harry O'Donald of the Morrow-Kennedy Co., of Atlanta was a caller this week and reports his two shovel outfits busy also team outfits and expects more work soon.

Any one having work for a small shovel outfit will be well to write Mike Casy, Birmingham, Ala., Mike says he is ready and willing.

Capt J. D. Henderson is a frequent caller at this office and we hail the Capt. with delight as several large contract jobs are started and completed and several Bucyrus shovels sold and bought during the Captain's stay.

Capt. Robt. Vance has taken a contract to load slag at Oxmoor, Ala. for the Birmingham Slag Company. The slag business seems to be flourishing at this time.

It is with regret we learn of the death of Victor Campbell of Birmingham. Mr. Campbell who only recently called at this office, seemingly in good health, was found dead in his room,

caused, it is supposed, from affection of the heart. Mr. Campbell for a long time was bookkeeper for Dunn & Lallande Bros. of this city, but more recently with Toney & Lawler, railroad contractors of Birmingham. He had the distinction of being a second cousin of the Duke of Argyll and only recently received a very nice letter from the Duke outlining the family tree.

The Watson Contracting Co. have finished their L. & N. work near Holmes Gap and have shipped a portion of their outfit to Birmingham for repairs.

The Sloss Sheffield Steel & Iron Co. have just installed a Little Giant shovel, which they purchased from the Bucyrus Co. through their Birmingham office, at their No. 7 washer plant near Russellville, Ala. This company now have twelve Little Giants in their mines. The first one being purchased in 1890 and in operation continuously ever since until quite recently. Their new No. 6 and 7 washers have over 2,000 tons daily capacity each and are of the latest design.

Arkansas

Lonoke—About 11 miles of macadam road near Carlisle will be constructed by Lonoke county. Cost about $60,000. Road will be 16 feet wide and include 15,000 cubic yards excavation. Hugh R. Carter, Little Rock, state highway engineer.

Little Rock—Contract has been awarded McCarthy & Peay at $48,000 for constructing seven miles macadam road, 16 feet wide, and requires 20,000 cubic yards excavation. Hugh R. Carter, state highway engineer.

California

Los Angeles and Vicinity.

By G. H. Hutchinson

Jack Gray found the climate too hot in Los Angeles and has gone to Portland, Oregon.

H. Marville is working for the Los Angeles, San Pedro & Salt Lake R. R. Co., at Caliente, Nevada.

John Miller came in from old Mexico. The country is getting too hot for him since the Rebels burned the post office at Tecate.

C. Sweet, better known as Handsome Case, has been acting queer for some time. We have a hunch that he comtemplates matrimony. We understand the lady is a resident of Los Angeles. We are at a loss to know whether to extend our congratulations or our sympathies to the lady.

Lee Moor, contractor, when he is at home with his wife is supposed to be at No. 323 West Missouri Street, El Paso, Texas, but at present he is in Los Angeles and has just been awarded a contract at $41,124.15 for constructing 5¾ miles of Caliente Kernville road under county highway specifications. P. H. Everett, chief engineer. There is a whole lot of things we might mention about Moor but we will save it for another issue.

Earnest Ward, engineer of the Los Angeles highway commission, at Pecoima, has been all swelled up for the past month just because Mrs. Ward presented him with a baby boy.

Wm. Gallagher, F. Barkley and Daugherty are working at Mulholland for the county highway commission.

E. S. Harper, father of Jess Harper, prominent shovel engineer with the Pacific Rock & Gravel Company, died of heart failure at the age of 54, at his home in Los Angeles.

It is reported that C. A. Roberts got married and we are informed it is the lady's second offense. She sure has got some job.

Hank Riebel wrote from Santa Rita, New Mexico, that he is getting along fine at his new position.

Al. Selbman, cranesman, pulled up stakes and went to Seattle, Washington.

R. A. Runquist, at Potholes, California, met with an accident and has a broken leg.

Joe Label, Ralph Brown and P. Pade are at Potholes, California working for the U. S. Reclamation Service.

Tom Kane, J. Cunningham, E. Danna and M. Greenbaum are back again in Mexico working for Robert Sherer & Company. This is part of the bunch that was mixed up in the Oklahoma land rush.

John Anderson, formerly master mechanic of the Los Angeles Aqueduct, intends to quit the shovel business and is going ranching at Modesto, California. John has been frequenting Harlow's Cafe and seems to be interested in chickens.

Joe Newton, from Seattle, where the steam shovel boys hold out, was in Los Angeles for a couple of weeks, accompanied by Mrs. Newton.

J. H. Hallenberger, proprietor of the U. S. Cafe, headquarters for steam shovel men, is at the police court quite often. He says it is on account of speeding in his new 90-H. P. Fiat. We are from Missouri and have not had a ride as yet. We have our doubts about the Fiat being able to exceed any limit.

Robert Sherer & Company, who for the past two or three years have been building the San Diego & Arizona railroad for John D. Spreckles, are at present, with the western end of their work, about 50 miles from San Diego. About 30 miles of their line is in Mexico and the time Admiral Badger was busy at Vera Cruz, somebody telephoned out to Sherer's camp that the Americans better beat it. The home coming of the bunch looked like an Oklahoma land rush.

P. A. Ransome, an active member of the Ransome Concrete Machinery Company of Dunellen, N. J., and well known to the contractors in the East and Middle West, was in Los Angeles recently on a business trip. P. A. is a Native Son and was much impressed with the growth of the Coast cities, and left here with a stiff neck from rubbering at the sky scrapers. He is also somewhat of a horticulturist and gathered considerable data regarding a new variety of bean that has been brought to perfection in California. He is under the impression they will thrive in the east and that a ready market can be found for them.

Chris Kaehler, recruiting officer of the steam shovel men, is all fussed up on account of the halt in hostilities in Mexico. His regiment is composed of engineers, cranemen and firemen. Chris says they will all make runners in time. We are inclined to agree with him especially if they happen onto a good sized bunch of Greasers. The uniforms are of the regulation color, with the backs of the coats and pants lined with manganese. Some class to this bunch.

Jim Cashion of Grant Brothers Construction Company has just been commissioned by some of his friends in Arizona to form a company of regulars. The commission was wired to Jim with instructions to get busy, and requested him to furnish 50 cases of Fernet, 50 cases of Vermouth, one flying machine and $10,000 in gold and proceed to Naco, Arizona. The ammunition went by express, and Jim and the money are going in the machine. For a time everything but the ammunition will be up in the air. This is another big job Grant Brothers has tackled and we are willing to put in with them that they will get away with it. Now its "Hats off," to Colonel Cashion.

Canada

Montreal and Vicinity.

Cook Construction Company & Wheaton Bros., who have a large contract in connection with the Halifax Ocean Terminals, are making good progress with the two 100-C Bucyrus shovels and the 12-yard Western air dump cars which they are using on this work. They expect to bring the 70-C, which they are now using on their Sudbury, Ont., work, to Halifax, also the Davenport locomotive and Western cars from the same place,

H. G. Puffer, who has had charge of some very large jobs in Canada was in Montreal recently; Hank looks very well indeed, hard work agreeing with him. He is looking over some work in this vicinity and we will in all probability see his smiling countenance about Montreal this summer.

The work on the St. John Valley railroad is just starting up. Corbett Construction Company, Kennedy & McDonald, and the Hibbard Company are getting their steam shovel men on the ground with a view to doing a big seasons work; Kennedy & McDonald having recently purchased a new 85-C Bucyrus shovel and the Hibbard Company two 50-ton locomotives from the Canadian Equipment Company Limited.

Notes from Vancouver, B. C.

Within the next week or ten days Victoria will commence work on the excavation of the ten-mile trench in which the steel pressure pipe for the Sooke Lake water works system will be laid from Humpback Reservoir to the city. This work will be rushed ahead in order that no delay may be encountered when the Burrard Engineering Company, of Vancouver, to which has been let the contract for the fabrication and laying of the pipe, starts delivering the pipe lengths.

Grant, Smith & Co., and McDonnell, contractors for the proposed two Dominion govt. concrete piers in Victoria, have awarded a contract for the cement required about 100,000 bbls., to the Vancouver Portland Cement Co., and the Bamberton Cement Co. This is one of the largest cement orders ever placed in this district.

A contract for rubble rock required for the foundations has been let to the Deep Cove Quarries, on Burrard Inlet, above Vancouver; a portion to be later taken from quarries at "Rosemont," at Esquimalt.

A meeting of interested land owners in the Sumas Dyking Dist. will be held at Sumas on Saturday May 23, to discuss details of the huge undertaking, for which the L. M. Rice Co., of Seattle, have the contract, at a price aggregating $1,000,000.

It is likely that work will start soon.

M. P. McLeod, general manager, is in Toronto arranging for Canadian Northern Railway work for the season. It is officially announced here that outside of completing the main line into Port Mann, the most important undertaking of the company will be the construction of a branch line from Kamloops into the fruit districts of the Okanagan, in British Columbia.

It is reported that the Dominion government authorities are now engaged in making preliminary surveys for proposed scheme for irrigating about 400,000 acres of land in Alberta, at some point north of Lethbridge.

Ottawa, Ont.—A contract has been awarded to Maguire & Cameron, St. Catherines, Ont., at about $84,000, for constructing section 4-A of Welland canal.

Calgary, Alta.—A contract has been awarded to George H. Webster, Calgary, Alta., by the Canadian Pacific railway for grading 25 mile extention to its Stirling-Lethridge line.

Winnepeg—Work will be started during summer by the Canadian Northwestern Railway Company on proposed railroad from Oliver, Alta., to St. Paul de Metis, Alta., about 100 miles.

Colorado

Grand Junction—Bids will be received until June 16, at the office of the Reclamation Service, Grand Junction, for earthwork on 30 miles of main canal, Grand Valley Irrigation project, Colorado, involving excavation of approximately 1,900,000 cubic yards of material.

Denver and Vicinity.

By H. N. Steinberger

John Young of the firm of Young & Crook of Denver, railroad contractors, has recently closed up all of their work on the Coal Road in Utah and moved most of the outfit to Guernsey, Wyoming, where they have a large tunnel contract on the Burlington. He spent a number of days in and around Salt Lake just before returning to Denver and it was with a great deal of regret that he passed up his numerous friends in that section after an almost continuous stay of eighteen months. We hope that conditions will soon improve in the intermountain section and they will succeed in landing a good piece of work for their 70-C Bucyrus shovel.

Work on the K. P. Division of the Union Pacific is progressing very rapidly all along the line. Nearly every contractor finishes a section and moves camp every week. During the past month several additional contracts have been let by Kilpatrick Bros., who have the general contract, so that now it is estimated that fully 250 teams are employed. Figuring drivers, men on the dump and in the pits, foremen, etc., it estimated that fully four hundred men are employed. The Union Pacific Co. have had for nearly two months five daily trains, transporting gravel for ballast from the Sherman Hill pits in Wyoming, and have employed approximately six hundred laborers in spreading and shouldering up the track. As a result something of a record is being made by all concerned.

"Doc" Conover shipped out his seventy head of horses from Denver to a nice piece of work on the Kansas Pacific contract. While in Denver he told of an offer of a big contract in the vicinity of Walsenburg, Colo. At the time that section was in the throes of warfare and "Doc" got cold feet. Well, we dont really mean that, for "Doc" is known for his bravery, but that was the way he expressed himself. Too warm in and around Walsenburg and much cooler in Kansas. We wish every reader of these columns could hear "Doc" express himself. Any time and on any subject. We want to go on record with the statement that he has the choicest vocabulary at his tongue's end, with the easiest flow without effort, inexhaustible and under perfect command at all times, than any other contractor in the inter-mountain section, and we bar none. Only one other notable can approach him and he is Pat Cain of Laramie, Wyo. Separately they both shine, but collectively "Doc" has Pat beat a mile.

Florida

Bartow—A contract has been awarded to A. D. Langford, Valdosta, Ga., by the Seaboard Air Line Railway Company to construct line from Bartow, Fla., to point Lake Wailes, Fla., distance about 25 miles.

Georgia

Washington—Washington & Lincolnton Railroad Co., Washington, Ga., have surveys under way for constructing line from Washington to Lincolnton, distance about 20 miles. Prof. C. M. Straham, University of Georgia, is in charge of engineering work.

Idaho

Idaho Falls—The Oregon Short Line has awarded the contract to the Utah Construction Co. for grading the right of way for the Snake River Valley Belt Line. The new line will be a loop between Idaho Falls and St. Anthony, Idaho, over 70 miles in length; the cost of construction will be $1,700,000.

It is proposed by the Oregon Short Line Railroad to build 25 mile extention to its Idaho Northern Branch from Smith's Ferry to Payette Lakes. A. M. Nelson, Salt Lake City, Utah, assistant engineer.

Illinois

Peoria—Walsh Construction Co., Davenport, Ia., has been awarded contract by Chicago & Northwestern Ry. for work on its Peoria line.

Pittsfield—Contract awarded R. H. & G. A. McWilliams, Chicago, Ill., at 7.8 cents per cubic yard for constructing ditch about 5 miles long, requiring 206,626 cubic yards excavating, and to Horace L. Winslow Co., Chicago, at $17,731.00 for pumping plant for same.

Winchester—Contract awarded R. H. & G. A. McWilliams, 28 E. Jackson boulevard, Chicago, for rebuilding levee and excavating canal in Big Swans Drainage District. Work includes 209,000 cubic yards embankment at 25 cents and 39,229 cubic yards ditch at 10 cents.

Kansas

Pittsburgh and Vicinity.

By W. S. Russell

The coal market is in a state of repose usual at this time of the year which is the dullest period for actual shipments. The favorable crop conditions, however, are causing activity in future bookings and in making contracts. With wheat in splendid shape in the southwest and about ten days earlier than usual a bumper crop seems to be assured and general business appears to be favorably affected thereby.

Prices are maintained the same as last month and we quote as follows: Lump per ton, $2.00; Nut per ton, $2.00; Mine run per ton, $1.65; Mill run per ton, $1.50; Slack per ton, $1.40; f.o.b. cars at the mines.

The J. J. Stephenson & Son Coal & Mining Co., recently incorporated, will open up a new field of 172 acres on the state line between Midway and Minden, Mo. They are putting in a tipple and two miles of railroad track which will give them access to three railroads for shipping coal, the Frisco, Missouri Pacific and Santa Fe. W. H. Stephenson has returned from a trip to Chicago, where he placed an order for a model 251 Marion steam shovel, that will be shipped about June 1st. W. H. Stephenson is manager and will have full charge of the plant, J. J. Stephenson is president and A. H. French, secretary, with offices in the Globe building, Pittsburg.

The Bucyrus Company has just sold two 175-B revolving coal stripping steam shovels, weighing over 200 tons a piece—one to the Clemens Coal Company and one to The Canal Fuel Compant, both of Pittsburg, with offices in the Globe building. Ira Clemens is president and D. W. Jones secretary of both companies. The first shovel is now being shipped from the works at South Milwaukee, Wis., and will open up a field of soft coal of extra good quality near Minden, Mo. The Clemens Coal Company have about 320 acres in this field, but will only open up a part of it at present.

The second shovel will be shipped about June 1st, and will open up a new field near Chicope, Kans.

There are several new coal stripping propositions on foot, and it appears quite likely that more steam shovels will be purchased this year.

Ira Clemens and J. H. Schlauger have returned from a trip to Chicago and Milwaukee, where they visited the works of the Bucyrus Company and saw the steam shovels under construction.

E. P. White of Smith, Scott & White has returned from a business trip to New Orleans and Memphis.

E. J. Scott of St. Louis and C. S. Smith of Memphis, both of the firm of Smith, Scott & White, were visitors at Pittsburg recently, for a day or two.

E. B. Meredith and brother of Joplin were at Pittsburg last week looking over the coal fields.

Ira M. Fleming of the Fleming Coal Co. was a guest at the Stilwell Hotel recently. His company are stripping coal at Scammon with a 175-B Bucyrus steam shovel.

Lee Bighy, superintendent of the Moka Coal Company at Mulberry, spent several days in Pittsburg last week. He says they are running every day, stripping coal with a 150-B Bucyrus steam shovel.

W. J. Lester, a contracting engineer of New York City, and D. H. Whitmer, a contractor of Philadelphia, spent a week at Pittsburg recently looking over the coal fields and investigating the big coal stripping steam shovels. Mr. Whitner, who has had an extensive experience in operating steam shovels, says they beat the world.

J. H. Sternberg and W. H. Meierstein, of the Sternberg Coal Company of Kansas City, spent several days in Pittsburg last week. This company owns about 400 acres of fine coal land at Minden, Mo. and may decide to develop it.

O. S. Hubert, manager Cherokee-Girard Coal Co., at Minden, Mo., spent a day or two in Pittsburg recently.

O. B. Moore of the Willis Shaw Machinery Co. of Chicago, made a flying trip to Pittsburg the other day. J. S. Patton took him to Frontenac to see his coal stripping plant and gave him an order for a hoisting engine in less than an hour. Mr. Moore is a hustler.

George Dean is prospecting a field of strip coal land near Hume, about 100 miles north of Pittsburg.

We met R. J. Lawrence mining engineer of the Carney Coal Co. the other day. He is still prospecting strip coal with fair success.

W. W. Millner of the Roy-Millner Coal Co. of Weir City, was in Pittsburg last week.

A number of the coal strippers have formed an association for selling coal, it is called the Interstate Coal Company, with agents at Kansas City, Omaha, Pittsburg and Joplin. It is evident that this combination will enable the company to take large contracts, which could not be handled by a single company. J. C. Arnold is general sales agent, office 615 R. A. Long Building, Kansas City, and Ed. Buxton division sales agent, Cunningham Building, Joplin, Mo. General office 217 Globe Building, Pittsburg, Kans.

The Pittsburg Machinery Company is located at 806 N. Broadway, where they accupy an entire building with a large stock of coal miners, mill and contractors' supplies, tools and machinery, engines, pumps, motors, etc., also repairs for Bucyrus steam shovels. Give them a call.

Stuart Crowe of the J. R. Crowe Coal & Mining Company of Kansas City, visited Pittsburg the other day, to look after the Company's interests in this field.

A. P. Green, manager and J. A. Glandon, vice-president of the Mexico Brick & Fire Clay Company, visited Pittsburg recently to look over the coal stripping, with a view to install one of the big revolving shovels in stripping fire clay at this Mexico, Mo. plant.

Maryland

Montgomery County—A contract has been awarded to Harper Voigt, 717 14th street, N. W., Washington, D. C., for contract No. 233, state highway, between Darnostown and Dawsonville, about 3.49 miles long, $36,000. Macadam.

Somerset County—A contract has been awarded to Winston & Co., Brown Station, N. Y., at about $81,000 for paving section road from Allen to Princess Anne, 5.68 miles. H. G. Shirley, engineer, Baltimore, Md.

Brentwood—Contract awarded Columbia Construction Company, Washington, D. C., for constructing 83 mile railway system from Brentwood to Gettysburg. Contract was awarded by the Washington, Westminster & Gettysburg Railway Company.

Massachusetts

Monroe Bridge—G. C. Willson formerly with the Porto Rico Irrigation Service in the Patillas Dam, Porto Rico, has recently come here to take charge of the Power Construction Co's work.

Bournedale—The E. W. Foley Contracting Corporation has been awarded contract by the Eastern Construction Company for the construction of its lines from Buzzards Bay, Mass to Sagamore and Sagamore Beach, Mass.

Sandwich—On Tuesday, April the 21st, the waters of Bainstable Bay and Buzzards Bay were officially united by president Aug. Belmont of the Boston, Cape Cod & New York Canal Company, with commander J. W. Miller, vice-president and general manager, Wm. Barclay Parsons, chief engineer, W. A. Harriman, son of the late railroad magnate, and Charles T. Warring, resident engineer, made the trip from the railroad bridge at Buzzards Bay through the canal in a motor boat. At Foley's dike the appro: priate ceremony was held and the small dike which held back the waters of the two bays was officially demolished. Rapid progress has been made on the canal the past few months. The dredges are deepening the channel, and it is expected that the water-way will be opened for small craft in the early summer and that the entire work will be completed before the first of next January.

Missouri

Rolla—The Rolla, Ozark & Southern Ry., Rolla, Mo., has awarded a contract for the construction of its proposed line between Rolla and Anutt, Mo., 18 miles, to J. Ellis Walker, general manager of the company.

St. Louis Notes.
By A. J. Michel

W. F. Woodruff has seven teams he would like to place on some railroad work. He has good new stock. At present he is doing temporary work for the Hydraulic Brick Co. Address him Union & Slevin Ave. St. Louis.

J. C. Settle & Co., 409 Burlington Building, St. Louis expect to have some teamwork in the very near future. In event they are the successful bidders they will be able to use a couple of team outfits.

Zay Gardener the well known track laying contractor was a visitor since our last issue. He has heard that someone could lay track cheaper than he could and not believing this he applied for a job as spiker at the enemy's camp. He was readily hired owing to his 6 feet 2 inches frame and brawny 230 pounds etc. etc. He was the best spiker likewise the best "PIKER" and after three days work found his enemy was laying track for $475 that he laid for $320.00 with nigger labor and at 25 cents per day higher wages. He was told to apply next day for his pay.

The Boss of the job was astonished to find a "Swell" looking individual with a four karet stud, a ring with three "small" karet and a half stones and some jim dandy charm (the writer knows) adorning him, looking for his pay envelope. Zay laughed at him and said "Have a drink on me."

Keating Bros. have a dandy 20 team outfit idle at Taylorville Ill. They have grader wagons, and wheelers. They can be reached at the above address.

Marshall Rust secured a river contract near Kansas City recently estimated at nearly $500,000. 10 new barges are being built for this work and other accessories pertaining to work of this kind.

J. G. Moore, the well known steam shovel engineer, has moved to DeWitt Mo. Only temporarily however, as he is there for the purpose of gaining some farm knowledge and buying a few mules. Moore recently bought a large ttract of plantation land in Mississippi. This is his last year of steam shoveling he says and expects to be a real farmer about January next.

H. R. Fardwell has about finished his rock contract at Mokane, Mo. He secured another contract the location of which we have not acsertained up to the present writing.

J. B. Dorris writes us from Walls, Miss., that he has about finished and will have a 40 team outfit available to place on some work soon. He is known as a man who finishes work in record time.

Geo. W. Gist made a hurried trip to Chicago recently to perfect arrangements for 50 miles of new work in Missouri just below St. Louis.

We are unable to say at this time just what has been done regarding this work but should he accept same, Mr. Gist will no doubt be able to place 100 teams on this work.

Mr. Gist can be reached at present at Mullens W. Va. or at his home address, Oak Park, Ill.

The labor market is still at ease around St. Louis. Especially so with foreigners. Anyone needing good Austrians for rock work or steamshovel work will find as good a class of men now as anytime in years. If you need anything in labor communicate with Tony Michel, 9 So. 9th Street.

M. D. Bagwell secured the contract for building the Rock Island spur near Chariton, Iowa. Work will commence at once.

Frank McKee has a good boarding outfit that he would like to place on some work. McKee has the reputation of feeding men well. Address him Madison, Ill.

H. H. Hall secured the contract for building 20 miles of sewers at Centrailia, Ill. He has a large force of men working and will be busy the greater part of the summer.

Minnesota

Bemidji—A contract has been awarded to W. M. Lana, Council Bluffs, Ia., at $257,333.49 for excavation and roads in connection with construction of Judicial Ditch No. 21. Includes 2,297,171 cubic yards excavation.

Duluth—A contract has been awarded to Charles W. Rood Construction Co., Grand Rapids, Wis., at 19 cents, for excavating for 14 miles open ditches, 3 foot base and 4 to 5 feet depth with 1.1 slopes along Miller Trunk road. Work includes 100,000 cubic yards. E. K. Coe, 205 Court House, engineer.

Minneapolis—The Minneapolis, St. Paul & Sault Ste. Marie has awarded to Peter Nelson, Minneapolis, Minn., the contract for the Makoti branch. Portions of the grading and steel laying have been sublet.

Notes from Duluth.

Contract has been awarded the Walton-Corr Contracting Co., 114 south 4th Street., Minneapolis, Minn., at $17,500.00 for constructing State Road No. 1, which lies south of Mille Lac Lake

and consists of ten miles of work running north and south. Work consists of grading, clearing, grubbing and ditching.

Plans are being made for much more extended operations in the recently discovered iron ore mining region in northern Wisconsin within five hours' ride of St. Paul on the Soo or Omaha railroads.

The center of the district is at Birchwood, Washburn County, Wis. George R. Slocum, of St. Paul, owns much of the land throughout Sawyer, Washburn, Barron and Rusk Counties, in which the ore is being mined. He has leased this to concerns which have started extensive drilling operations. Several independent companies also plan to enter the field.

Mr. Slocum has had an artesian well sunk at one of the drill holes on his land. This is said to be the only artesian well in that part of Wisconsin. When the water course was first struck the well delivered at the surface a measured flow of 60-gallons of water a minute. This flow was maintained over the top of a casing 15 or 20 feet above the surface of the ground, and Holman I. Pearl, exploration engineer, believes the pressure is great enough to throw the water to a greater height if piped, as the flow is believed to come from one of the lakes higher up in the hills.

The iron ore was discovered to exist in paying quantities last December around Birchwood and near Rice Lake. This is said to have followed a two years' geological survey extending over the larger portions of Washburn and Sawyer counties.

Top dirt found in the vicinity contained 45 per cent of iron ore. It is said that with modern machinery this can be profitably worked with the ore containing larger percentages of iron.

W. J. Gleason, Contractor of Aitkin, Minn., has been awarded contract by the Commissioners of Aitkin County for construction of Ditch No. 20, requiring the excavation of 950,000 cubic yards of material at 11 cents per cubic yard.

The Rood Construction Co. of Grand Rapids, Wis., has been awarded contract for construction of St. Louis County Ditch No. 2, near Duluth Minn., at $37,597.50. More than 8,000 acres will be drained by this ditch.

Mississippi

Clarksdale—Contract awarded Stacy & Dulany by the Yazoo Mississippi Delta Levee Board for 1,380,000 cubic yards levee enlargement at $375,000. Work will include fourteen miles of levee and will be commenced at once.

Montana

Malta—Contract for 160,000 cubic yards of excavation of irrigation ditches in the Milk River project will probably be awarded to James O'Conner, Council Bluffs, Ia., who submitted the lowest bid May 12th. Other bidders were: Dooling Bros., Tampico, Mont.; C. F. O'Neil, Yankton, S. D.; Brown & Leahy, Lewistown, Mont.; Russell Condon, South Omaha, Neb.; Chas. Wilhite & Co., Malta, Mont.; Winston Bros. Co., Minneapolis, Minn.; Henser & Sim, Malta, Mont.; Hoy & Johnson, St. Paul, Minn.; Tebbs & Taggart, Jurgens & Knipe, Glasgow, Mont.; McArthus Bros. Co., Chicago, Ill.

United States Reclamation Service is asking for proposals for earthwork and structures, Dodson South Canal, Milk River irrigation project, Montana. Work involves about 145,000 cubic yards excavation; 2,650 cubic yards reinforced concrete, placing of 260,000 pounds steel reinforcement and placing in wooden structures of about 150,000 feet B. M. of lumber. It is situated on south side of Milk River in vicinity of Malta, adjacent to main line of Great Northern railway. Bids will be opened at office of Reclamation Service at Malta on June 10, 1914.

North Dakota

It is reported that the Northern Pacific has decided to construct, this summer, a 15-mile line from Harlem to Elliott, N. D.

New York

New York Items.

Russell Klockner has started his state road work near Trenton, N. J. The 14-B shovel has been started in the first cut.

The Rob Roy Construction Company are installing their new 18-B on their Maryland state road work near Somerfield, Penna. John Gonsalus anticipates setting a new excavating record on this job.

Dave Hennessey is running a shovel for Wilson & English Construction Co. on their New Haven work near Ellis, Mass.

The Degnon Contracting Company, who have the contract for the Seventh Avenue Subway in New York City, are making very good progress with their new 18-B Bucyrus revolving shovels, which they have found particularly adapted for their work.

Jacobs & Davies, general contractors for the New York Municipal Railway Corporation, who are building the Thirty-eighth Street Branch of the subway, are pushing this work through to rapid completion with two 70-C Bucyrus steam shovels. The shovels are loading into 12-yard Western air dump cars hauled by Pennsylvania switchers furnished by the General Equipment Company.

The Pierson Engineering & Construction Company of Hartford, Connecticut, have a large contract for building a reservoir and dam for the City of Hartford, amounting to about $250,000.00. Two hundred and fifty thousand yards of excavation will be handled with a 18-B Bucyrus revolving shovel, which is en route at the present moment.

The Barker-Bonner Company have started their road contract at Poplar, Maryland. A 14-B Bucyrus shovel has been put to work by erector, William Dunphy. John R. Magonegal will operate this shovel.

Thomas Conner & Sons, general contractors of Philadelphia have their 14-B shovel in operation.

R. L. Koehler, superintendent of the Scranton & Binghamton Railroad Company, reports that increased progress will be made this season on the construction of their new line from Scranton to Binghamton.

George Hyman is operating his 45-C Bucyrus on excavation for the New Central High School at Florida Ave. and 11th St., Washington, D. C. Dave Williams engineer, W. May cranesman and R. Miller fireman. Work consists of about 70,000 yards of excavation. Loading into wagons.

Albany—Contract for Erie Canal, Section 5, was awarded May 5th, 1914, to Frank L. Cohen, 49 Niagara St., Buffalo, N. Y., at $16,573.50. Duncan W. Peck, superintendent of public works.

Ohio

Cuyahoga Falls—The Pennsylvania Railroad Co. contemplates double tracking the road between Akron and Hudson.

Panama

Panama—All steamshovel work in connection with the terracing of the west bank of Culebra Cut between Rio Grande village is to be completed not later than June 15, and all construction tracks north of Rio Grande will be removed. A part of the spoil taken from this excavation is being used in making an embankment fill to the east of the Miraflores spillway channel,

in order to protect the land in this vicinity which includes Corozal farm, and the village itself, from inundation in case of a sudden rise in Miraflores Lake, and an unusually heavy flow over the spillway.

Pennsylvania

Creekside—George W. Bickerstaff is craning a 70 ton Bucyrus shovel for the Miller Construction Company on yard work for the Buffalo Rochester and Pittsburg railway.

Dubois—The Pennsylvania will start work this summer on the proposed 12 mile line from Dubois, Pa., to Mehaffey, connecting with the Tyrone branch at Hepburnia.

South Dakota

Veblen—The contract recently let by the Fairmount & Veblen Ry. for the 40 mile extension, was awarded to H. A. Whittier, Northfield, Minn., and Nels Brolander. Grading will be commenced at once. J. H. Thomas is chief engineer.

Belle Fourche—Contract has been awarded to T. M. Riley, Omaha, Neb., at $120,000 for extending main canal of Belle Fourche Irrigation Project 6 miles and for system of laterals, and to the Owen Construction Co., Denver, Colo., at $29,718.40 for earthwork on North canal extension and laterals, Belle Fourche Irrigation project. Work covers about 5 miles of North canal and 14 miles laterals, involving excavation of about 199,200 cubic yards of material.

Tennessee

Memphis—A contract has been awarded to M. J. Rosch & Co., Memphis, for extending Yazoo & Mississippi Valley line southward to Swan Lake; 9.15 miles, including about 100,000 cubic yards of excavation.

Texas

Uvalde—The L. J. Smith Construction Co., Kansas City, Mo., will shortly commence work on the proposed 50-mile railroad line from this city to a point near Leaky.

Utah

Salt Lake City and Vicinity.

By H. N. Steinbarger

By the time this goes to press, Mrs. and Mr. G. W. Hamilton of Hamilton and Gleason railroad contractors will have returned from a sojourn in and around Los Angeles, Cal. They recently completed their contract or rather series of contracts, on the D. & R. G. Ry. double tracking near Lehi and Springville, Utah. One of their 70-C Bucyrus shovels was sent up on the new D. & R. G. detour line near Tucker, Utah, to clear away an earth and rock slide of about 20,000 yards. But as that was being handled nicely by the crew, there was nothing to cause a postponement of the California trip. With the new "lease in life" they will be full of aim and will need action. We hope "action" on another big job will materialize.

Contracts were signed about May 8th, between the Utah Construction Company and the Oregon Short Line Railroad for the grading of seventy-four miles of right of way preparatory to laying ties and rails between Lincoln Sugar Works spur, Bonneville county, Ida., and Menan, Ida. The total expenditure will be in excess of $2,500,000 when the track is ready for trains and it is the intention of the Oregon Short Line in 1915 to extend the trackage twenty-two miles further south and connect with the main line at Blackfoot. The new line will be known as the Snake Valley loop.

The steel already has been ordered and the ties are being made in northern Idaho and Wyoming. A force of men sufficiently large to complete the grading during the summer will be put to work at once and it is the intention of the railroad to lay the steel as fast as the grading progresses.

The building of the Upper Snake Valley loop was authorized by R. S. Lovett, chairman of the executive committee of the Union Pacific system, on his visit to Salt Lake during December. It was at that time he definitely announced that the Oregon Short Line would not build the Burley cutoff, but would look toward the development of new territory. E. E. Calvin, general manager of the Oregon Short Line, drove over the greater part of the country which the new lines passes through, and saw the need of such a line in that section. Other contractors, who looked over the work, were Kilpatrick Bros., Twohy Bros., Porter Bros., and MacArthur Bros. The Utah Construction Company covered the line with sub-contracts within about six days, and expect to clean up the entire job in record time. E. O. Wattis had active charge of the sub-letting. Some of the subs are, L. R. Wattis Co., Banks Bros., L. R. Heiselt, Malcolm Bros., W. M. Smith, all of Salt Lake City; A. C. Bird, Springville, Utah, J. Jensen, Spanish Fork, Utah, L. B. Hammon, Roy, Utah, Corey Bros. Construction Co., Ogden, Utah, Thorn & Whiting, Springville, Utah, and Peter Cook of Idaho. The work runs very light all scraper and wheeler, except a small portion of elevating grader cuts.

Articles of incorporation will be filed here within the next few weeks for the Southwestern Pacific Railroad. It is proposed that this line connect the tremendous undeveloped iron and coal fields of southern Utah with Sandiego. Press reports state that the line is to be controlled by the Hill interests. Preliminary announcements state that it will run from Grand Junction, Colo. to Sandiego, Cal. At the former place it will connect with the Colorado Midland, which in turn connects with the Burlington at Denver. R. E. Clapp of Salt Lake is chief consulting engineer and F. B. Robinson, chief field engineer. Mr. Clapp in a recent address at Sandiego states that this road will ultimately make Sandiego the largest shipping port on the Pacific Coast.

A few weeks ago earth slides completely covered one of the tracks on the new detour around Soldier Summit on the Denver & Rio Grande, described in our March number and as a result some trains were sent over the old line. The few warm days of spring caused the snow to melt and the rains caused the sides of the large cut to become soft and several tons of earth and small rock slid down on the tracks. Both detour tracks were blocked several hours, but as only a small part of the slide covered the second track that was easily cleared.

A steam shovel was sent to the scene of the slide. It is expected that slides will occur from time to time on the new line during the spring and the coming fall as the sides of the cuts have not yet fully settled. It is not thought that the track has been damaged to any serious extent.

G. A. Heman, general contractor of St. Louis, Mo. recently received a new 14-B Bucyrus shovel at Salt Lake City, Utah, where he has various large contracts for street paving and concrete sidewalk construction. The shovel is being used for grading, dumping into wagons. Salt Lake contractors have proven conclusively that steam shovel grading of streets is cheaper than any other method, even when as little as a foot of depth of material is to be excavated. P. J. Moran Inc. and J. W. Mellen both large Salt Lake contractors have small revolving shovels and use them continuously on street work.

Mike Dooling of Dooling Bros. of Denver and Kansas City, railroad contractors, was recently in Salt Lake City on a business trip. The attraction was the letting of the St. Anthony Loop contract of the Oregon Short Line Ry. near Idaho Falls, Idaho. He didnt tarry long after the contract was awarded to the Utah Construction Co., but hastened back to Denver where he has made headquarters for several years.

Bonds of the Ogden, Lewiston & Northern Railroad Company have been sold in Paris, according to a cablegram received by the Salt Lake Security and Trust Company. Fred W. Crockett of Logan is in Paris, where he negotiated the sale.

It is announced that work on the line will be begun within sixty days. The route of the road is through Ogden Canyon and over the divide into Cache Valley, thence northword to Preston, Ida. The interests behind the road are prominent men of northern Utah and southern Idaho.

The Butte, Boise & San Francisco Railroad filed its articles of incorporation with the secretary of state at Helena recently. The articles are an amendment to the articles of the Butte, Boise & Winnemucca Railroad, filed six months ago. The capitalization is $125,000,000 with shares at a par value of $100. Of this amount $1,066,000 has been subscribed.

The road is planned to tap some of the richest agricultural and mining districts in the three states, and eventually will be extended to San Francisco, according to the plans announced by the promoters. L. O. Leonard is named as presidnet.

Virginia

Notes from Richmond

Johnson & Briggs advise that their work on the L. & N. railroad between Winchester & Irving will soon be completed. There was one Vulcan and two Bucyrus shovels on this work. The crews for the Bucyrus shovels were C. H. Comer and R. T. Morgan, engineers, F. Lampson and A. L. Garrett, cranesmen. The Vulcan shovel was shut down sometime ago.

Washington

Spokane—Cockran & Wilson, of Spokane, Wash., have the general contract for the Edgecomb cutoff of the Northern Pacific, and have sublet some of the work to H. C. Wolfe. Actual construction will be started at once.

West Virginia

Charleston—Bids will soon be asked for by Charleston, Parkersburg & Northern Railroad for constructing proposed 75 mile line from Parkersburg, via Rockport, Sandyville, Ripley, Fairsplain, Kenna, Sissonville & Guthrie to Charleston, W. Va. Henry H. Archer, Parkersburg, W. Va., is president, and states that estimates will be ready about July 1.

Wisconsin

Milwaukee—The C. H. Starke Dredge and Dock Company have recently been absorbed by the Great Lakes Dredge and Dock Company of Chicago, Illinois.

Milwaukee—The Chicago, Milwaukee & St. Paul R. R. will undoubtedly take steps shortly toward the depression of the tracks on the northwest side of this city. The total cost will amount to about $20,000,000.

Sturgeon Bay—Work will be started June 15, on the proposed line of the Door County Peninsula R. R., a 40-mile standard gage, steam and gasoline electric line north from this city. The roadbed will be 14 feet wide laid with 65 pound steel, ¾ mile 2% maximum grade, including 200,000 cubic yards of grading, stone box culverts, 16 bent pile trestle. E. E. Galle & Co., Plymouth Building, Minneapolis, Minn., promoter. F. G. L. Hunt, 1940 Garfield Street N. E., Minneapolis, directing engineer.

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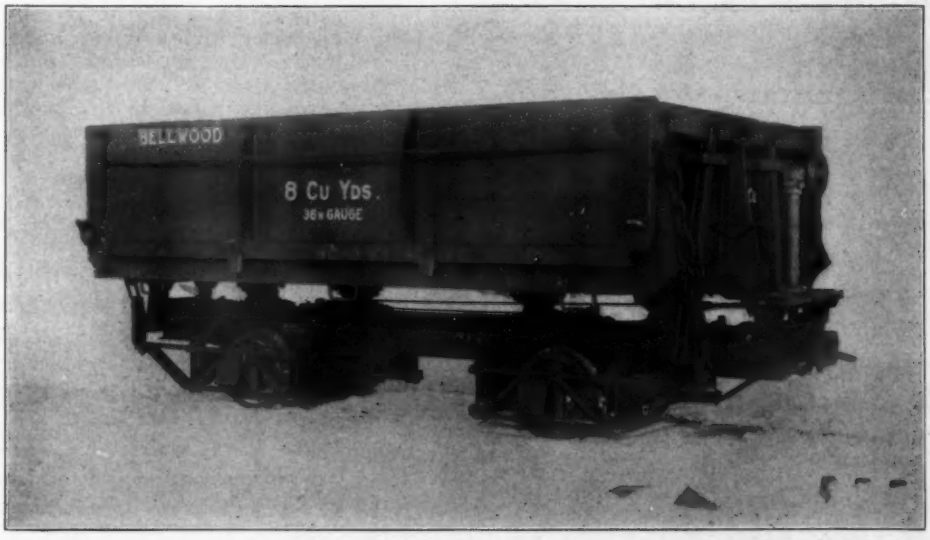

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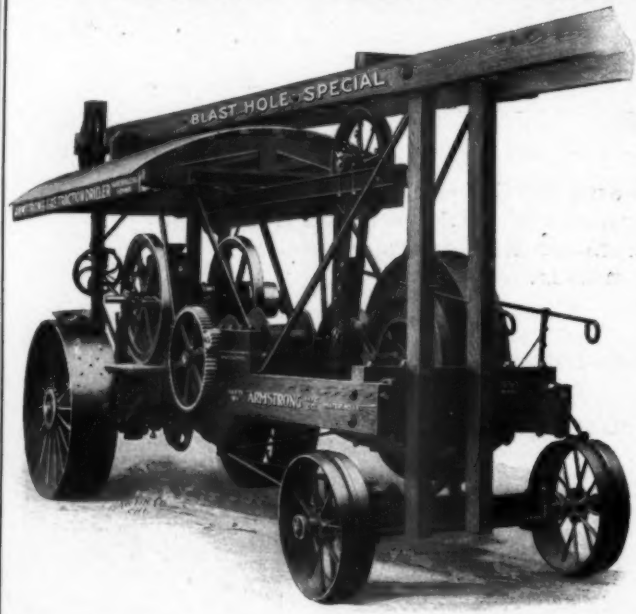

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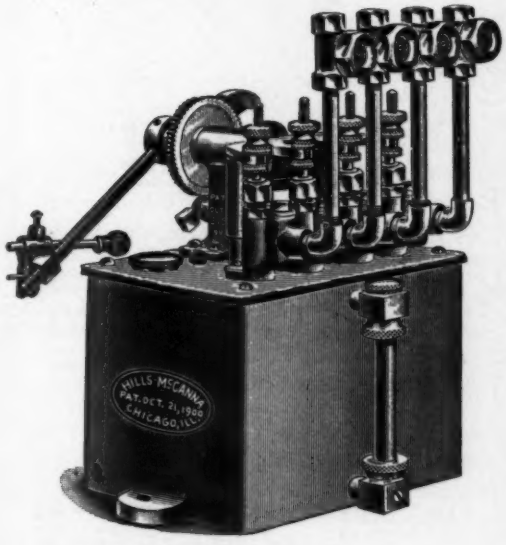

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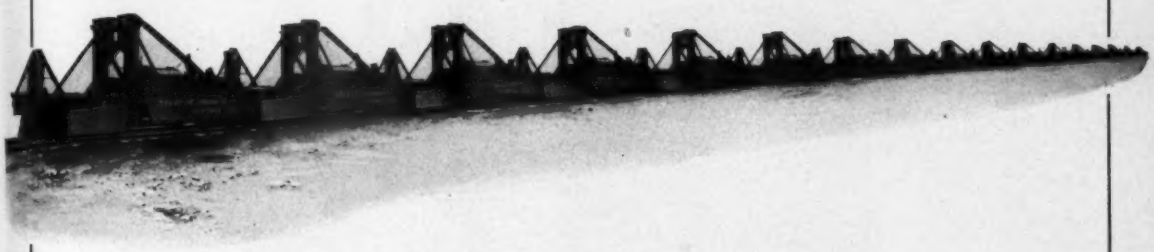

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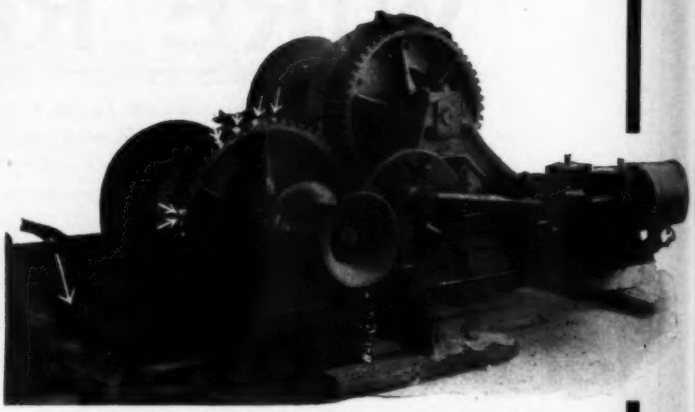
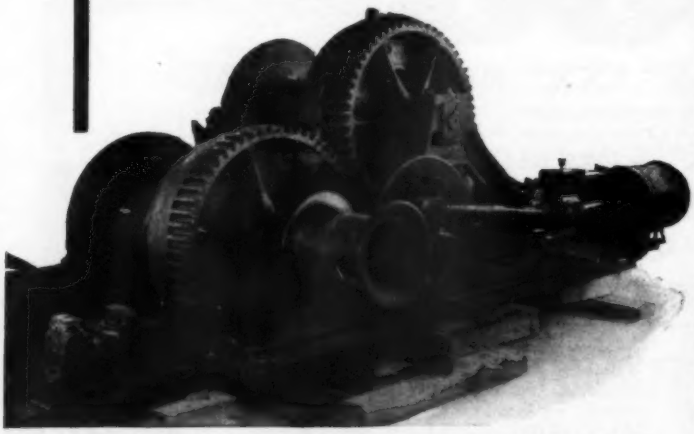


Broken Frame and Teeth of Large Hoisting Engine.
As shown this frame and six teeth 4 ins. long and 1 in. high by ¾ in. thick were broken beyond quick and economical repair by ordinary methods. They were welded the by OXWELD PROCESS in 12 hours as shown in the lower photograph.



Hoisting Engine Completely Repaired Ready for Use. Welded in 12 Hours.

The range of repair work possible with a Welding Plant is practically unlimited. Not only does it embrace repairs to iron and steel castings and forgings of all kinds and cracks in boiler plate, but new metal may be added to build up parts worn too low for service.

Job Welding

At our Chicago and Newark Plants we maintain a Special Job and Contract Welding and Cutting Department. Work of all kinds can be done in our shops—or where conditions demand we can have our skilled operators with the necessary equipment on the ground at short notice.

Write for Estimate on Welding your next piece of broken equipment.

OXWELD ACETYLENE COMPANY

NEWARK, N. J. CHICAGO LOS ANGELES
37th Street and Jasper Place

LARGEST MAKERS OF WELDING AND CUTTING APPARATUS AND SUPPLIES IN THE UNITED STATES

ON STEAM SHOVEL WORK

it is as important to have the best locomotives as it is to have good cars and shovels.
This is why there is such a demand for

DAVENPORT LOCOMOTIVES

This illustration shows our 17x24, 47 ton 6-wheel connected locomotive with separate tender that we recommend for 12-yard service. We equip these locomotives either with or without the air-dumping arrangement, as desired.

Our engines have large free steaming boilers built to pass any inspection specified.
Several sizes carried in stock for immediate shipment.
If interested in locomotives, ask for our catalogue.

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St. Paul, 1308 Pioneer Bldg.
St. Louis, 654 Pierce Bldg.
New Orleans, 208 Godchaux Bldg.
New York City, 362, 50 Church St.
Seattle, 617 Western Ave.
Pittsburgh, 405 Oliver Bldg.
Montreal, 286 St. James St.
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DAVENPORT LOCOMOTIVE WORKS, Davenport, Iowa

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Contractors' Cars or Track

Equipped
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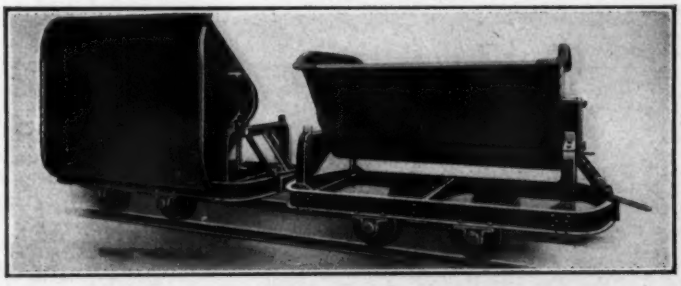
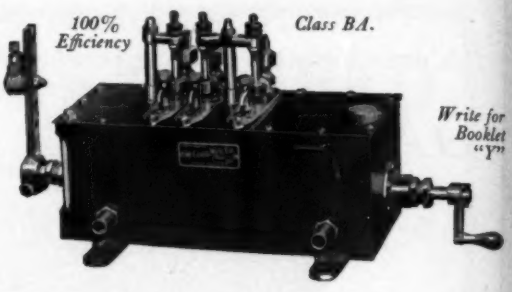


Are you a contractor? Then you know that next to an efficient Industrial Railway System you must have a dependable source of supply for accessories—rails, switches, frogs, turntables, etc. We can take both the matter of the Railway System and the accessory problem off your mind. Carrying forward the specialization of the Ernst Wiener Company, we automatically take foremost place in this field. NO MATTER WHAT YOUR TRANSPORTATION PROBLEM, put it up to us. Our stock is large, our service prompt. We are ready, also, to quote interesting figures on Plate, Tank and Structural Iron Work for all purposes.

May we hear from you?

Easton Car & Construction Co., Main Office and Works: Packer Street, Easton, Pa.

Read What This Firm of Contracting Engineers Says:—



Replying to your letter of the 5th. in reference to McCORD CLASS BA LUBRICATOR, will say that this lubricator was installed on February 14th. and has been very satisfactory.

So far it has effected a saving of about 50 per cent in oil.

Prior to its installation we were using from seven to eight quarts of oil daily. Since then, we have been using about three and a half quarts daily.

Very truly yours,
A. J. TWIGGS & SON,
By Jno. D. Twiggs.

Our Steam Shovel Model

has the following special features:—Auxiliary Hand Crank, Reversible End Bearing, Drain Plug in Reservoir and Heating Chamber.

Test one for a month at our expense.

McCord Manufacturing Co.

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259

Buy the Chain That Stands the Strain

A few days ago an officer of the Taylor Chain Company visited one of the largest quarries in the middle west, where four big steam shovels were tearing away at the rock—He was greeted by the runner of the first shovel as follows:—*"Your chain has been on my shovel for 10 months, it is going yet!"* By the second:—*"You've got the strongest chain on the market for work like this!"* The third and fourth added their testimony to the fact that

TAYLOR MESABA

wears the longest and gives the greatest yardage of any chain they ever used!

THE MAN WHO PULLS THE LEVER KNOWS!

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⅞"-1"-1⅛"-1¼"-1⅜"-1½"-1⅝" carried in stock

Known the World Over

The Only Water-tight Leather Sole Rubber Footwear Made

Here Is the Reason

Here Is Proof:

Rubberhide Company,
Essex Bldg.,
Boston, Mass.

Gentlemen:—

As per my last night's message you see we are short of boots again. If you could give us an immediate shipment of part of our order, we would appreciate it very much.

I can well understand why there is such a demand for your goods, as we have found them very satisfactory.

Very truly yours,
(Signed) Name On Request.

A 25% ORE- EAR FEATURE

All Rubberhide Boots and Ezoa Shoes have malleable iron heel rims. No extra charge.

RUBBERHIDE Economy Begins Where Ordinary Rubber Boots Wear Out

Write for Catalog and Prices

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No. 5 Blasting Machine

SAVE TIME and MONEY
By Using
DU PONT
BLASTING MACHINES

EVERY day more blasting is being done with electrical blasting machines. Why?

Because several bore holes can be fired at one operation. Such action disloges more material than many single shots.

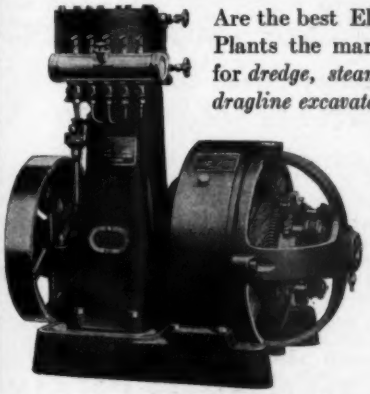
Less drilling and loading is necessary when electrical blasting replaces single-shot methods.

Put this new improved, powerful, strongly made No. 5 Blasting Machine to work. It's a time and money saver, and lessens blasting accidents.

FOR SALE BY ELECTRICAL SUPPLY HOUSES OR BY

DU PONT POWDER COMPANY
WILMINGTON, DELAWARE

THESE
GENERATING SETS



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Send for descriptive bulletins and testimonials.

They are convincing.

Manufactured by
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ELECTRIC & MECHANICAL WORKS
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"HERCULES SOLID WELD"
Every Link as Strong as the Solid Bar

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It is a marvel in rock work

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BUILT FOR GEORGIA COAST & PIEDMONT R. R.

GASOLINE LOCOMOTIVES

have unquestioned advantages for certain kinds of work, and when properly designed are as reliable as steam power.

The illustration shows a standard gauge locomotive for light switching and special service. It has a positive drive from engine to wheels and is designed, as far as possible, like a steam locomotive. This type has proved successful, and should be investigated before purchasing locomotives for industrial or contractors' service.

If desired, locomotives of this type can be arranged to use alcohol instead of gasoline.

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110-C Bucyrus
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Class 80 Atlantics
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18-B Bucyrus Revolving
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3—9 x 14 Vulcan 36 in. Gauge
1—12 x 18 American, Standard Gauge
*1—13 x 18 Porter, Standard Gauge
*1—14 x 22 American, Standard Gauge
*1—16 x 24 Porter, Standard Gauge
*3—16 x 24 American, Standard Gauge

HEAVY LOCOMOTIVES

6—40 Ton Penna. R. R. 4 Wheel Switchers
*5—40 Ton Bladwin 4 Wheel Switchers
4—55 Ton Penna. R. R. 6 Wheel Switchers
1—50 Ton 18 x 24 6 Wheel Switcher
3—55 Ton 18 x 26 Mogul
4—55 Ton 18 x 24 TEN WHEEL
5—65 Ton 20 x 24 CONSOLIDATION
6—70 Ton 20 x 26 MOGUL
4—75 Ton 20 x 28 MOGUL

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Drag Lines
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ALPHABETICAL LIST OF ADVERTISERS

	Page
American Locomotive Co.	352
Armstrong Manufacturing Co.	348
Baldwin Locomotive Works, The	350
Bellwood Dump Cars	359
Bucyrus Co.	Inside Front Cover and Inside Back Cover
Bureau of Engraving, Inc.	358
Columbus Chain Co.	358
Cyclone Drill Co.	360
Davenport Locomotive Works	355
Dull Co., The Raymond W.	346
DuPont Powder Co.	357
Easton Car & Construction Co.	355
Engberg's Electric and Mechanical Works	357
General Equipment Co.	359
Haggard & Marcusson Co.	353
Hayden-Corbett Chain Co.	353
Hills-McCanna Co.	349
Jordan Company, The O. F.	351
McCord Manufacturing Co.	356
Meisenheimer Printing Co.	358
Michel, A. J.	350
Neidlinger, C. R.	357
Oxweld Acetylene Co.	354
Roebling's Sons Co., John A.	353
Rubberhide Co.	357
Southern Iron & Equipment Co.	360
Taylor Chain Co., S. G.	356
Troy Wagon Works Co.	350
Western Wheeled Scraper Co. Outside Back Cover	
Zelnicker Co., W. A.	360

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Three years experience on Bucyrus shovels. Splendid references. M. E. DEMMITT, Union Bridge, Md.

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Long experience on large shovels, can furnish good references. Will work this season for $100. per month. P. O. Box 607-B, Excavating Engineer.

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A married man with seven years experience, handling hydraulic dredges, wants a position with some dreding company. Can install machinery and get results. Reference furnished. P. O. Box 607-C, Milwaukee, Wis.

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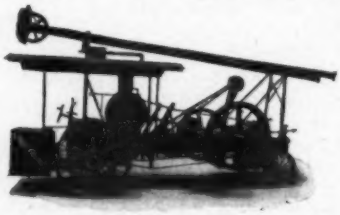
THAT'S WHY CYCLONE BIG BLAST HOLE DRILLS



are being used by nearly all of the busiest and most up-to-date contractors, who can't afford to waste time and who, on account of keen competition, must reduce excavation costs to the lowest possible figure.

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